Quick Reference Guide for Clinicians

Number 19

Early Identification of Alzheimer's Disease and Related Dementias

U.S. Department of Health and Human Services
Public Health Service
Agency for Health Care Policy and Research

Clinical Practice Guideline

Early Alzheimer's Disease

Attention Clinicians:

The *Clinical Practice Guideline* on which this *Quick Reference Guide for Clinicians* is based was developed by a multidisciplinary panel comprising health care professionals and consumer representatives sponsored by the Agency for Health Care Policy and Research (AHCPR). Panel members were:

Paul T. Costa, Jr., PhD (Cochair)
T. Franklin Williams, MD, FACP (Cochair)
Marilyn S. Albert, PhD
Nelson M. Butters, PhD (Deceased)
Marshal F. Folstein, MD
Sid Gilman, MD
Barry J. Gurland, FRCPhys, FRCPsych
Lisa P. Gwyther, MSW, CCSW, ACSW
Albert Heyman, MD
Alfred W. Kaszniak, PhD, ABPP
Ira R. Katz, MD, PhD
Linda L. Levy, OTR/L
Nancy Emerson Lombardo, PhD
Nancy K. Orr-Rainey, MSG
Linda R. Phillips, PhD
Martha Storandt, PhD
Eric G. Tangalos, MD
May L. Wykle, PhD, FAAN

Consultants to the panel were:

Kathryn Bayles, PhD
Elizabeth Q. Bulatao
Rupert Francis, MD
Catherine Hollis
John W. Kirk, MD
Douglas Lanska, MD
Dorothy Rice, PhD
Gary Stephenson, MS
Thomas V. Trainer
Gary V. VandenBos, PhD
Carol Weisman, PhD

The panel used an explicit, science-based methodology along with expert clinical judgment to develop specific statements on recognition and initial assessment of Alzheimer's disease and related dementias. Extensive literature searches were conducted and critical reviews and syntheses were used to evaluate empirical evidence. Peer review was undertaken to evaluate the validity, reliability, and utility of the guideline in clinical practice.

This *Quick Reference Guide for Clinicians* presents summary points from the *Clinical Practice Guideline*. The latter provides a description of the guideline development process, analysis and discussion of the available research, strength-of-evidence ratings for recommendations, information for health care decision-making, a list of resources, and references. Decisions to adopt particular recommendations from either publication must be made by practitioners in light of available resources and circumstances presented by individual patients.

AHCPR invites comments and suggestions from users. Please send written comments to:

Director, Office of the Forum for Quality and Effectiveness in Health Care
AHCPR, Willco Building, Suite 310
6000 Executive Boulevard
Rockville, MD 20852

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Early Identification of Alzheimer's Disease and Related Dementias

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Abstract

This *Quick Reference Guide for Clinicians* contains highlights from *Recognition and Initial Assessment of Alzheimer's Disease and Related Dementias, Clinical Practice Guideline No. 19*, which was developed by a multidisciplinary panel composed of health care professionals and consumer representatives. The *Quick Reference Guide* focuses on (1) symptoms that suggest the presence of a dementing disorder and (2) steps to follow in conducting an initial assessment for Alzheimer's disease or a related dementia, including use of specific mental and functional status tests on the basis of their efficacy and clinical utility in discriminating early-stage dementia. It also addresses how to interpret test results, the role of neuropsychological testing, and resources for patients and families facing a diagnosis of probable dementia.

Suggested Citation

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Early Identification of Alzheimer's Disease and Related Dementias

Purpose and Scope

Dementia is a syndrome of progressive decline that relentlessly erodes intellectual abilities, causing cognitive and functional deterioration leading to impairment of social and occupational functioning. Because Alzheimer's disease is the most common dementing illness in the United States, it is used as a prototype for dementia in this guide unless otherwise stated.

An estimated 5 to 10 percent of the U.S. adult population ages 65 and older is affected by a dementing disorder, and incidence doubles every 5 years after age 65. Despite its prevalence, dementia is often unrecognized or misdiagnosed in its early stages. Failure to identify early-stage dementia can result in inappropriate treatment, hazardous situations, and needless distress. Early recognition of dementia, however, not only can prevent problems but also can allow the patient and family to plan for the future and consider participation in trials of promising new therapies as they are developed.

A number of characteristics distinguish early-stage dementia from normal aging and from other syndromes that involve cognitive problems, including depression. This guide provides information to help clinicians recognize those characteristics as symptoms suggestive of a dementing disorder and to conduct an initial assessment of mental and functional status. The recommendations are intended for use by primary care clinicians, including but not limited to family physicians, internists, geriatricians, psychologists, psychiatrists, nurses, and nurse practitioners. They are not intended to replace existing recommendations for a differential diagnosis once dementia has been identified.

Recognizing Symptoms

Certain "triggers" (clues, symptoms) should prompt a clinician to conduct an initial assessment for dementia rather than attribute apparent signs of decline to aging. Examples of such triggers appear in Table 1. Although the patient, family members, or others often bring their concerns about symptoms to the clinician's attention, clinicians also should be alert to such signs during office visits.

Table 1 is a clinical guide, not a validated test instrument. In asymptomatic persons who have possible risk factors (see box), the clinician's judgment and knowledge of the patient's current condition, history, and social situation (living arrangements, support services, isolation) must guide the decision to initiate an assessment for dementia.

Table 1. Symptoms that may indicate dementia

Does the person have increased difficulty with any of the activities listed below?[a]

_____ *Learning and retaining new information.* Is more repetitive; has trouble remembering recent conversations, events, appointments; frequently misplaces objects.

_____ *Handling complex tasks.* Has trouble following a complex train of thought or performing tasks that require many steps such as balancing a checkbook or cooking a meal.

_____ *Reasoning ability.* Is unable to respond with a reasonable plan to problems at work or home, such as knowing what to do if the bathroom is flooded; shows uncharacteristic disregard for rules of social conduct.

_____ *Spatial ability and orientation.* Has trouble driving, organizing objects around the house, finding his or her way around familiar places.

_____ *Language.* Has increasing difficulty with finding the words to express what he or she wants to say and with following conversations.

_____ *Behavior.* Appears more passive and less responsive; is more irritable than usual; is more suspicious than usual; misinterprets visual or auditory stimuli.

In addition to failure to arrive at the right time for appointments, the clinician can look for difficulty discussing current events in an area of interest, and changes in behavior or dress. It also may be helpful to follow up on areas of concern by asking the patient or family members relevant questions.

[a] Positive findings in any of these areas generally indicate the need for further assessment for the presence of dementia.
Source: Guideline panel.

For Alzheimer's disease, the only well-established risk factors are family history of dementia and the presence of Down syndrome. Genetic studies show that autosomal-dominant forms of Alzheimer's disease are associated with early onset and early death. Recent research also suggests an association of certain apolipoprotein E (apoE) genotypes and late-onset Alzheimer's disease; however, apoE genotyping is not a definitive diagnostic tool.

Evidence also suggests the possibility of a modest but significant association with earlier head trauma involving loss of consciousness.

Initiating an Assessment

To help determine whether a patient's symptoms meet current criteria for dementia (see box), an initial assessment should combine information from several sources. The basic components of this assessment are a focused history, a physical examination, a functional status assessment, and a mental status assessment. The recommended assessment process is presented in the Figure.

> According to current criteria, a diagnosis of dementia requires evidence of decline from previous levels of functioning and impairment in multiple cognitive domains (see *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* [DSM-IV], American Psychiatric Association, 1994).

Focused History

A focused history is critical in the assessment for dementia. It must identify signs and symptoms such as those listed in Table 1 and document the chronology of problems. Particularly important are

- Mode of onset (abrupt versus gradual).
- Progression (stepwise versus continuous decline; worsening versus fluctuating versus improving).
- Duration of symptoms.

In addition to containing a detailed description of the chief complaint, a focused history should include relevant medical, family, social and cultural, and medication history (including alcohol use).

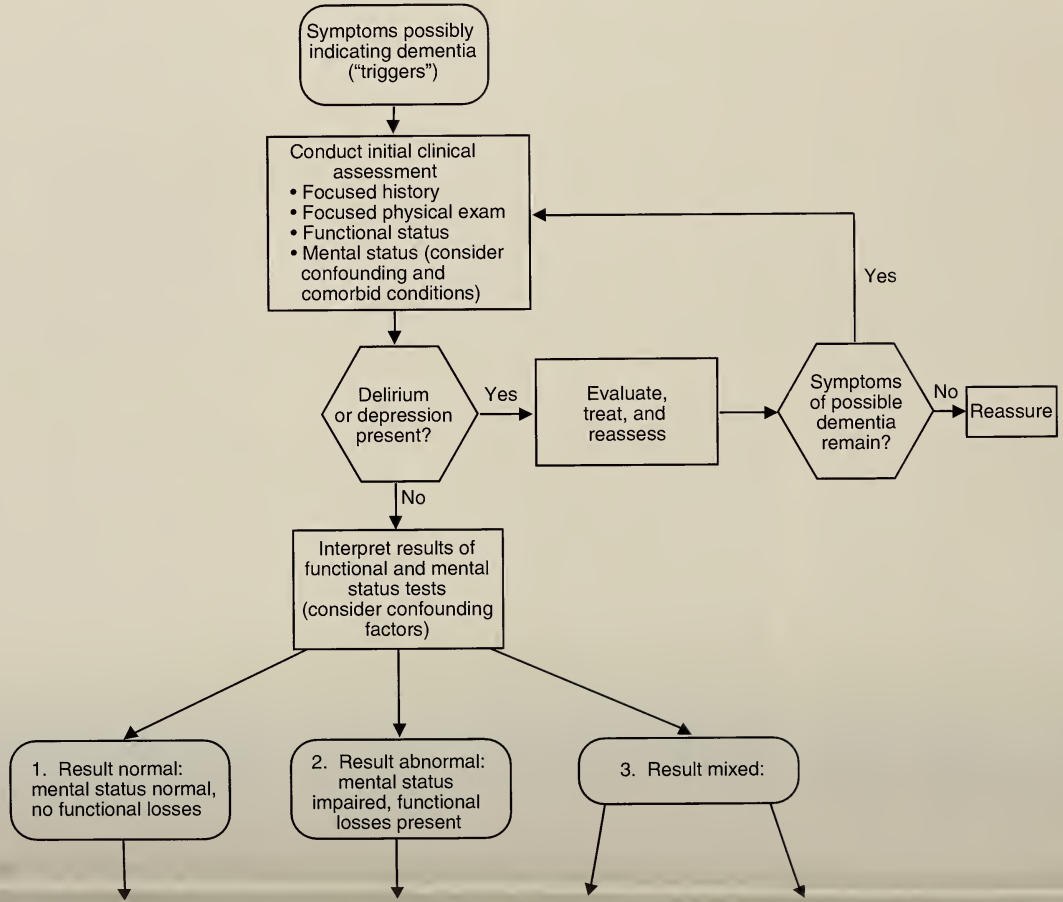
Medical history. Ask about relevant systemic diseases; psychiatric disorders; known neurological disorders, including history of head trauma; alcohol or substance abuse; and exposure to environmental toxins. Because many medical conditions may cause or contribute to cognitive impairment, review information about any intercurrent, infectious, or metabolic illness, such as pneumonia, urinary tract infection, diabetes, or acute or chronic renal failure.

Family history. Inquire about a family history of early-onset Alzheimer's disease or other rare genetic conditions that lead to dementia, such as Huntington's disease.

Social and cultural history. Include information about recent life events and social support networks, education, literacy, and socioeconomic, ethnic, and cultural background. These factors may affect performance on mental status tests; some studies have found that they may affect the risk for dementia as well.

Medication history. This is a critical component of the initial evaluation, because drug toxicity is the most common cause of dementias that can be resolved or significantly ameliorated. A wide range of drugs have been associated with cognitive changes (see Table 2). Consider any drug, including over-the-counter medications and alcohol, as potentially suspect. Encourage patients to bring all medication bottles and pills to the appointment.

Figure. Flow chart for recognition and initial asssessment of Alzheimer's disease and related dementias



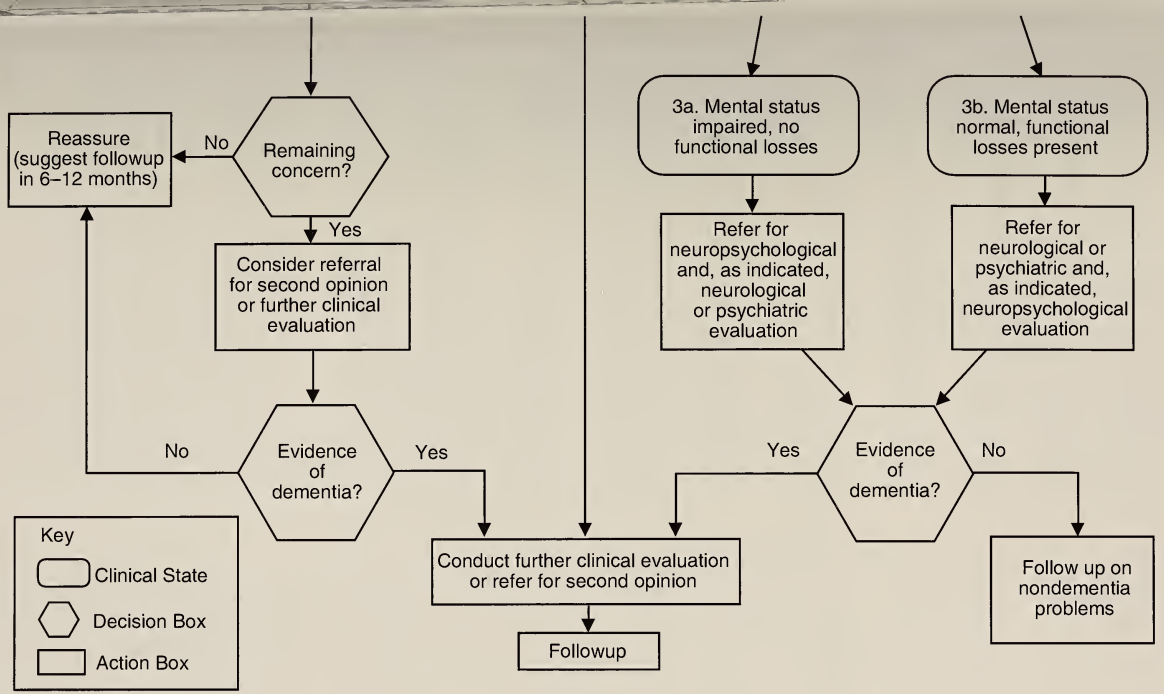

Reassure (suggest followup in 6–12 months)
No
Remaining concern?
Yes
Consider referral for second opinion or further clinical evaluation
No
Evidence of dementia?
Yes
3a. Mental status impaired, no functional losses
3b. Mental status normal, functional losses present
Refer for neuropsychological and, as indicated, neurological or psychiatric evaluation
Refer for neurological or psychiatric and, as indicated, neuropsychological evaluation
Yes
Evidence of dementia?
No
Conduct further clinical evaluation or refer for second opinion
Follow up on nondementia problems
Followup
Key
Clinical State
Decision Box
Action Box

Table 2. Some medications that may cause cognitive impairment

Type of medication and generic name [a]
Antiarrhythmic agents: disopyramide, quinidine, tocainide
Antibiotics: cephalexin, cephalothin, metronidazole, ciprofloxacin, ofloxacin
Anticholinergic agents: benztropine, homatropine, scopolamine, trihexyphenidyl
Antidepressants: amitryptyline, imipramine, desipramine, fluoxetine
Anticonvulsants: phenytoin, valproic acid, carbamazepine
Antiemetics: promethazine, hydroxyzine, metoclopramide, prochlorperazine
Antihypertensive agents: propranolol, metoprolol, atenolol, verapamil, methyldopa, prazosin, nifedipine
Antineoplastic agents: chlorambucil, cytarabine, interleukin-2
Antimanic agents: lithium
Anti-Parkinsonian agents: levodopa, pergolide, bromocryptine
Antihistamines/decongestants: phenylpropanolamine, diphenhydramine, chlorpheniramine, brompheniramine, pseudoephedrine
Cardiotonic agents: digoxin
Corticosteroids: hydrocortisone, prednisone
H_2 receptor antagonists: cimetidine, ranitidine
Immunosuppressive agents: cyclosporine, interferon
Narcotic analgesics: codeine, hydrocodone, oxycodone, meperidine, propoxyphene
Muscle relaxants: baclofen, cyclobenzaprine, methocarbimol
Nonsteroidal anti-inflammatory agents: aspirin, ibuprofen, indomethacin, naproxen, sulindac
Radiocontrast agents: metrizamide, iothalamate, iohexol
Sedatives: alprazolam, diazepam, lorazepam, phenobarbital, butabarbital, chloral hydrate

[a] These are examples only; new medications appear regularly. Many compounds contain other active ingredients.
Source: Guideline panel.

Informant reports. Whenever possible, obtain the history from both the patient and reliable informants, such as family members or close friends. Informant reports can supplement information from patients who have experienced memory loss and may lack insight into the severity of their decline.

Reports from relatives, however, may be influenced by the nature of the relationship to the patient. For this reason, more than one family informant or a family consensus approach can increase the accuracy of conclusions about the presence and range of cognitive impairments in persons suspected of having dementia.

When an informant is available:

- Interview the patient alone first, to respect the patient's dignity.

- Tell the patient that others will be interviewed.
- Interview informants separately from the patient to increase the likelihood of candor.
- Consider the possibility of questionable motives in informant reports. For example, symptoms may be minimized if the family is concerned about the patient's being denied admission to a nursing home; conversely, symptoms may be exaggerated or fabricated if an informant is motivated by financial or other considerations.

Focused Physical Examination

Use standard medical principles to guide a focused physical examination conducted as part of an initial assessment for dementia: life-threatening or rapidly progressing conditions must be identified first. Life-threatening conditions include mass lesions, vascular lesions, and infections. Assess carefully for conditions that cause delirium, which is a medical emergency requiring immediate attention. (see Assessing for Delirium section). Also be alert to signs of abuse and neglect of patients by caregivers, and report suspected abuse to the proper authorities.

Functional Status Assessment

Use a standardized test to evaluate functional status. For evaluating complex or difficult cases, informant-based scales are particularly important.

Among standardized tests, the Functional Activities Questionnaire (FAQ) is currently the best discriminator for early-stage dementia (see *Clinical Practice Guideline* for details of meta-analyses). The FAQ is an informant-based measure. Every effort should be made to find a reliable informant. Components of the FAQ and information on its administration and scoring appear in Attachment A.

Mental Status Assessment

A quantitative mental status examination should be part of an initial assessment for dementia. Although a comprehensive mental status examination that provides a detailed cognitive profile of the patient is desirable, it is impractical for most clinicians. Several brief, quantitative tests can provide useful information about mental status. They feature systematic, structured questions or tasks that can be scored easily. Table 3 presents a summary of cognitive elements measured by several brief mental status tests and their requirements for testing (e.g., verbal ability or vision).

Brief mental status tests are not diagnostic. They are used to:

- Develop a multidimensional clinical picture in conjunction with functional performance and the patient's signs and symptoms.
- Provide a baseline for monitoring the course of cognitive impairment over time.
- Reassess mental status in persons who have treatable delirium or depression on initial evaluation.
- Document multiple cognitive impairments, as required for a diagnosis of dementia.

Table 3. Components of commonly used brief mental status tests and requirements for testing

	MMSE	BIMC	BOMC	STMS
Components of cognition measured (listed in the DSM-IV criteria for dementia)				
Immediate memory	X			X
Short-term recall	X	X	X	X
Abstract thinking				X
Judgment				
Aphasia	X			
Apraxia	X			
Agnosia	X			
Constructional ability	X			X
Additional components of cognition measured				
Concentration	X	X	X	X
Spatial ability, orientation	X	X	X	X
Requirements for testing				
Verbal responses	X	X	X	X
Reading ability	X			
Writing ability	X			X
Mathematical ability	X			X
Vision	X			X
Motor control skills	X			

Note: MMSE = Mini-Mental State Examination, BIMC = Blessed Information-Memory-Concentration Test; BOMC = Blessed Orientation-Memory-Concentration Test; STMS = Short Test of Mental Status.
Source: Adapted from White H, Davis PB. Cognitive screening tests: an aid in the care of elderly outpatients. J Gen Intern Med 1990;5:438–45. Copyright 1990, Society for Research and Education in Primary Care Internal Medicine. Used with permission.

No single mental status test is clearly superior (see *Clinical Practice Guideline* for details of meta-analyses). The following four brief mental status tests are largely equivalent in their discriminative ability:

- Mini-Mental State Examination (MMSE).
- The Blessed Information-Memory-Concentration Test (BIMC).
- The Blessed Orientation-Memory-Concentration Test (BOMC).
- Short Test of Mental Status (STMS).

Information on administration and scoring of these tests appears in Attachments B through E. Any of the tests is acceptable, if its utility is not limited by a patient's confounding or comorbid conditions (see below).

The MMSE is the most widely used brief mental status test in the United States and the most comprehensive of the brief tests; however, several studies have shown that it has differential sensitivity for various cognitive domains. On the basis of these studies, an MMSE finding of impairments in memory and at least one other cognitive area suggests dementia, but a finding of impairment only in memory does not necessarily exclude the possibility of dementia.

In diagnosing mild dementia, reliable informants' accounts of minor cognitive changes in a person suspected of dementia may be as important as—or more important than—quantitative assessments, which can be insensitive to mild impairment.

Confounding and comorbid conditions. Visual and auditory impairments and physical disabilities may affect performance on both mental status and neuropsychological tests. Assess the patient for such conditions and consider them in the selection of tests (see Table 3). For example, the MMSE's praxis and drawing portions make it unsuitable for a patient who has impaired motor control. In such cases, use other tests (e.g., the BIMC).

When possible, correct visual and auditory deficits before testing. When this is not possible or when a physical disability is present, consider referral for neuropsychological evaluation that uses the patient's unimpaired faculties and capacities. For testing any older adult, make sure that the following conditions are adequate: lighting, contrast of visual stimuli, and volume and distinctiveness of auditory stimuli.

Assessing for Delirium and Depression

During the focused history and physical examination, look for evidence of an acute confusional state or delirium, and for dysphoric mood suggesting depression. These conditions can be mistaken for, or coexist with, dementia; they also can occur together.

Delirium and depression need to be addressed promptly and explicitly. If symptoms suggesting dementia remain after the patient has been treated for delirium or depression, continue the assessment for dementia.

Delirium

Although delirium is common in older persons with acute or chronic illnesses, it is underrecognized in clinical settings. This underrecognition can have serious consequences, because delirium is a medical emergency requiring immediate further evaluation and treatment. Some of the underlying causes (e.g., bacterial meningitis or hypoglycemia) can be fatal. If delirium is recognized early, it may be possible to prevent disability and irreversible deterioration.

A person who displays the following symptoms is likely to have delirium rather than uncomplicated dementia:

- Sudden onset of cognitive impairment.
- Disorientation.
- Disturbances in attention.
- Decline in level of consciousness.
- Perceptual disturbances (e.g., hallucinations).

In addition to common medical conditions, adverse effects of the following types of medications are also common causes of delirium:

- Anticholinergic agents.
- Antipsychotic agents.

- Antidepressants.
- Digoxin.
- H_2-blocking agents.
- Antihypertensive agents.

To improve recognition of delirium, use mental status tests to identify patients with cognitive impairment, and establish the symptoms' history of onset and degree of fluctuations. Several systematic methods of assessing for delirium have been found effective (see Selected Bibliography).

Depression

Although depression is the most common psychiatric illness in older persons, it is often underdiagnosed, especially when physical illness is present. Diagnosis is complicated because (a) depression is often mistaken for dementia and vice versa, (b) each may present as the other, and (c) they may coexist (e.g., DSM-IV categories of dementia with depressed mood). Changes in memory, attention, and executive function suggest depression; marked visuospatial or language impairment suggests a dementing process.

Problems are associated with misdiagnosing dementia as depression. In addition to the unnecessary expense, inappropriate treatment for nonexistent depression in a person with progressive dementia may exacerbate the condition because antidepressants that have anticholinergic properties may worsen confusion or memory impairment. In persons with coexisting depression and Alzheimer's disease, failure to diagnose and treat the depression may cause unnecessary emotional, physical, and social discomfort for both patient and family.

For these reasons, assessing for depression is an important part of the initial evaluation of any older adult suspected of cognitive impairment, especially for persons who complain of memory difficulty.

When taking the history, look for symptoms consistent with the DSM-IV definition of depression. If depression is suspected, (a) evaluate further, (b) treat appropriately (depression in older adults often responds to treatment with antidepressants, psychotherapy, electroconvulsive therapy, or all of the above), and then (c) reassess the patient for dementia.

Clinical interview. The clinical interview is the mainstay for evaluating and diagnosing depression in older adults. The DSM-IV provides some guidance on obtaining relevant information and observations. In applying DSM-IV criteria, however, be aware that physical conditions or behavioral changes common among older persons may account for many DSM-IV symptoms of major depression, such as:

- Changes in sleep pattern or appetite.
- Fatigue.
- Behavioral slowing or agitation.
- Complaints of diminished ability to think or concentrate.

Drug interactions that result from polypharmacy also can produce depression or depression-related symptoms and contribute to cognitive impairment.

Depression assessment instruments. Brief self-report questionnaires can facilitate initial screening for depression. The following two self-report instruments have established reliability and validity:

- The *Geriatric Depression Scale (GDS)*, developed specifically for use with older adults, is a 30-item

questionnaire that has a simple yes/no format and takes only 8 to 10 minutes to administer. A 15-item form of the GDS is also available.

- The *Center for Epidemiological Studies Depression Scale (CES-D)* is a 20-item questionnaire that can be administered in 5 to 8 minutes.

Self-report instruments have shown lower frequencies of depression-related symptoms in patients with Alzheimer's disease compared with informant sources or trained clinical observers. They should be used with caution for persons suspected of having dementia. Depression screening in patients suspected of dementia should include information from both a patient self-report and a caregiver (or informant) report, as well as direct clinician observation of the patient's behavior. A good time to ask about other symptoms (see box) is right after the functional assessment.

> Memory difficulty, agitation, disrupted sleep–wake cycle, and personality changes (e.g., apathy, increased dependence) are classic symptoms of Alzheimer's disease that may be mistaken for depressive signs of poor concentration, decreased interest, changes in psychomotor activity, sleep disturbance, and fatigue.

Interpreting Findings

The combination of findings from the assessments of mental and functional status can yield three possible results: (a) normal, (b) abnormal, and (c) mixed. The following recommendations, geared to each of these results, provide a framework for clinical decisions and should be used in conjunction with patient-specific circumstances.

Normal Results

If findings from both the mental and the functional assessment are normal, reassure the patient and concerned family members or friends and suggest reassessment in 6 to 12 months (or whenever further concerns develop). If concerns remain, consider referral for a second opinion or for further clinical evaluation:

- For concern about the adequacy of the mental status test, refer for further neuropsychological testing.
- For concern about possible depression or other emotional problems, refer for further psychiatric or psychological evaluation.
- For concern about possible loss of social and instrumental functioning caused by a neurological disorder not detected in the functional assessment, refer to a neurologist.

Abnormal Results

If findings from both the mental and the functional assessment are abnormal, the patient is likely to have a dementing illness and should have further clinical evaluation. This evaluation should include differential diagnosis, treatment, and continuing care as indicated. The Selected Bibliography lists guidelines for further clinical evaluation.

Laboratory tests may be appropriate when specific medical conditions are suspected. However, a laboratory test should not be used as a screening procedure solely to identify probable early-stage dementia or as a routine part of an initial assessment for dementia.

Mixed Results

Mixed results—abnormal findings on the mental status test with no abnormalities in functional assessment or vice versa—call for further evaluation. For example:

- Patients who have abnormal results on only the mental status test require more complete neuropsychological testing. If results indicate possible neuropsychiatric or systemic neurological problems as well, refer to an appropriate specialist.
- Patients who have declining function but normal mental status test results require either (a) further neurological evaluation for systemic neurological diseases or (b) psychiatric or psychological evaluation, if evidence suggests depression or other emotional problems.

Clinical presentations that could produce mixed results include:

- A person with lifelong borderline or retarded intellectual functioning who has learned to perform routine activities of daily living (ADLs) adequately.
- A person with a dementing illness who lives in an environment where functional supports mask evidence of significant functional impairment.
- A person with high intelligence and education who scores within the normal range on a mental status test but shows clear functional decline, especially on demanding tasks (e.g., instrumental activities of daily living [IADLs]).

Importance of Cognitive Baselines

Because cognitive performance can vary from day to day, an initial assessment of cognitive impairment needs to be verified by reassessment. A cognitive baseline is an important benchmark for confirming cognitive decline and evaluating its nature and magnitude. A baseline measure is especially useful for:

- Persons of initially high cognitive ability whose early decline may be difficult to find on initial testing.
- Persons found to have only mild impairment who require several examinations conducted weeks or months apart to document stable or progressing cognitive problems.
- Persons who minimize or deny problems because of lack of insight or denial.

Confounding Factors

Assess confounding factors such as age, educational level, and cultural influences and consider them in the interpretation of mental status test scores.

Age and educational influences. Both age and education can affect performance on most mental status and neuropsychological tests. On the MMSE, for example, significant correlations have been found between MMSE scores and

both age and years of schooling. Evidence suggests that:

- Low education increases the likelihood that an unimpaired person will test as cognitively impaired (false-positive error), especially for those who have fewer than 9 years of education.
- A high educational level increases the likelihood that a cognitively impaired person will test as unimpaired (false-negative error).

Age- and education-stratified data are available only for the MMSE (see Attachment B). If the MMSE is the mental status test used, refer to these stratified data in interpreting test results. For other brief mental status tests, take these factors into account in setting the threshold for dementia for test results. As always, the clinician's knowledge of each patient should guide consideration of these confounding factors.

Cultural influences. Primary language, race, ethnicity, and cultural bias also can affect performance on mental status tests and some neuropsychological tests.

Research suggests that several neuropsychological tests (e.g., some Wechsler Adult Intelligence Scale Revised [WAIS-R] subtests, the FAS Controlled Oral Word Association Test) may place Hispanic persons and possibly members of other racial or ethnic groups at a disadvantage, particularly in the use of culturally inappropriate norms or cut-points. The Consortium to Establish a Registry for Alzheimer's Disease (CERAD) has developed Spanish-language versions of its clinical and neuropsychological assessments. Copies are available from CERAD (see Table 4).

Use the focused history and physical examination to evaluate English language ability. Then determine whether it is appropriate to administer an English-language version of a mental status test or make a referral to someone who is competent in the patient's primary language.

Role of Neuropsychological Testing

Neuropsychological assessment can make an important contribution to identification of mild dementia, particularly when delayed recall is measured. It can

- Give information about the specific nature of strengths and deficits in cognitive functions.
- Assist in diagnosis, particularly in cases of mild impairment, high premorbid intellectual ability, or an unusual combination of cognitive impairments.
- Contribute to recommendations for treatment and management of behavior problems.
- Provide a baseline measurement for judging the effects of treatment or disease progression.

Neuropsychological tests can measure performance across different domains of cognition, including orientation and attention, language functions, visual motor constructional ability (praxis), memory, abstract and conceptional reasoning, and executive functions (formulating goals, planning, and executing plans). A person's pattern of performance across such tests can help in (a) identifying dementia among persons with high premorbid intellectual functioning,

(b) discriminating patients with a dementing illness from those with focal cerebral disease, and (c) differentiating among certain causes of dementia.

Neuropsychological evaluation may be useful in certain circumstances: (a) when the mental status test is abnormal but the functional assessment is normal; (b) when a family member expresses concern or dementia is suspected and results of mental status tests are within the normal range and the patient has more than a high school education or an occupation that indicates high premorbid intelligence; and (c) when mental status test results indicate cognitive impairment and when any of the following circumstances apply to the patient:

- Low level of formal education.
- Evidence of long-term low intelligence (more than 10 years).
- Inadequate command of English for the test.
- Minority racial or ethnic background.
- Impairment in only one cognitive area on mental status tests.
- No evidence of cognitive impairment for more than 6 months.
- No evidence of functional impairments.

Neuropsychological evaluation must be interpreted within the context of other clinical information, such as informant-based history of cognitive decline; evidence of impairment in IADLs; educational background; assessment for depression; sensory impairment; and factors other than dementia that may account for impaired performance (see Confounding Factors).

Importance of Followup

Followup, with assessment of declining mental function, may be the most useful diagnostic procedure for differentiating Alzheimer's disease from normal aging. For this reason, repeat the mental status test over a period of 6 to 12 months and note change or stability of scores. (For the MMSE, a change of four points per year is expected in scores of persons with Alzheimer's disease.) In cases of referral, make sure test results and medical records follow the patient from the specialist back to the referring clinician.

When a diagnosis of dementia is made, the patient and family members have serious issues to consider. The progressive nature of cognitive impairment makes followup especially important for persons with Alzheimer's disease or a related disorder; however, followup cannot be ensured. For this reason, the visit during which the diagnosis is given is an appropriate time for the clinician to discuss relevant issues with the patient and family or close friends, for example:

- The patient's competence to drive and carry out other routine functions that raise issues of safety (e.g., cooking); manage finances; supervise or care for grandchildren.
- Financial, legal, and medical planning, including execution of a durable power of attorney for health care.

The list of resources in Table 4, provided in take-home form, can be

helpful to families when they are ready to confront the many implications of a diagnosis of dementia. A consumer education version of this guideline is also available (see inside back cover for ordering information).

Table 4. Resources for health professionals, patients, and families

Name of Organization	Explanation
Administration on Aging 330 Independence Avenue, SW Washington, DC 20201 (202) 619-1006 Fax: (202) 619-7586 Internet: http://www.aoa.dhhs.gov	The Administration on Aging (AoA) coordinates delivery of services specified by the Older Americans Act. Services are coordinated and provided through 57 State agencies and 657 areas. The range of services provided by these Agencies on Aging (AAA) varies, but all include nutrition, access, in-home, and community services. Addresses and phone numbers of State and local AAAs are available from the national office. The Elder Care Locator (800-667-1116) provides a toll-free access number to locate State agency networks.
Alzheimer's Association 919 North Michigan Avenue Suite 100 Chicago, IL 60611-1676 (312) 335-8700 800-272-3900 for information and local chapter referrals nationwide (24-hour telephone line) Internet: http://www.alz.org	The Alzheimer's Association is a national voluntary organization with 220 local chapters and more than 2,000 support groups. The Alzheimer's Association funds research, promotes public awareness, advocates legislation for patients and families, and provides support services, including support groups, adult day care programs, respite care programs, and telephone helplines through its national, chapter, and volunteer network.
Alzheimer's Disease Centers (access through ADEAR; see next entry)	The National Institute on Aging, part of the National Institutes of Health, supports 28 Alzheimer's Disease Centers across the country. This program provides clinical services, conducts basic and clinical research, disseminates professional and public information, and sponsors educational activities. A growing number of satellite clinics associated with this program are helping to expand diagnostic and treatment services in rural and minority communities and collect research data from a more diverse population.

Table 4 (continued)

Name of Organization	Explanation
Alzheimer's Disease Education and Referral Center P.O. Box 8250 Silver Spring, MD 20907-8250 800-438-4380 Fax: (301) 495-3334 Internet: adear@alzheimers.org	The Alzheimer's Disease Education and Referral (ADEAR) Center, a service of the National Institute on Aging, provides information and publications on Alzheimer's disease for health professionals, people with Alzheimer's disease and their families, and the public. The ADEAR Center serves as a national resource for information on diagnosis, treatment issues, patient care, caregiver needs, long-term care, education, research, and ongoing programs. In addition, the Center provides referrals to national and State resources.
The Corporation for National Service Office of Public Liaison 1201 New York Avenue, NW Washington, DC 20525 (202) 606-5000 Fax: (202) 565-2794	The Corporation for National and Community Service is a public corporation that administers Federal service programs, including AmeriCorps, the Foster Grandparent Program, and the Senior Companion Program (SCP), which provides supportive services to adults with physical, emotional, and health limitations. A major SCP emphasis is preventing or delaying institutionalization. Foster Grandparent volunteers work with children, including those with disabilities. AmeriCorps members address a range of local health issues.
Other Resources	
American Association of Retired Persons (AARP) Washington, DC (202) 434-2277 800-424-3410 AARP Pharmacy Price Quote Center 800-456-2226, (open 24 hours a day) American Bar Association Commission on Legal Problems of the Elderly Washington, DC (202) 662-8690 Children of Aging Parents Levittown, PA (215) 945-6900	Consortium to Establish a Registry for Alzheimer's Disease (CERAD) Durham, NC, (919) 286-6406 or 6405 Insurance Consumer Helpline Washington, DC 800-942-4242 Medicare Beneficiaries Defense Fund New York, NY (212) 869-3850 800-333-4114 Medicare Hotline Baltimore, MD 800-638-6833

Table 4 (continued)

Other Resources	
National Association for Continence Spartanburg, SC 800-BLADDER (800-252-3337) National Citizen's Coalition for Nursing Home Reform Washington, DC (202) 332-2275 National Hospice Organization Arlington, VA (703) 243-5900 800-658-8898 National Parkinson's Foundation East Coast: Miami, FL 800-327-4545 West Coast: Encino, CA 800-522-8855	National Stroke Association Englewood, CO (303) 771-1700 800-STROKES Social Security Information 800-772-1213 (open 7 am–7 pm in all time zones) U.S. Department of Veterans Affairs Regional Office, Veterans Assistance Washington, DC (202) 418-4343 800-827-1000

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Attachment A. Functional Activities Questionnaire (FAQ): Administration and Scoring

The FAQ is an informant-based measure of functional abilities. Informants provide performance ratings of the target person on 10 complex, higher-order activities.

Individual Items of the Functional Activities Questionnaire

1. Writing checks, paying bills, balancing a checkbook.
2. Assembling tax records, business affairs, or papers.
3. Shopping alone for clothes, household necessities, or groceries.
4. Playing a game of skill, working on a hobby.
5. Heating water, making a cup of coffee, turning off the stove.
6. Preparing a balanced meal.
7. Keeping track of current events.
8. Paying attention to, understanding, discussing a TV show, book, or magazine.
9. Remembering appointments, family occasions, holidays, medications.
10. Traveling out of the neighborhood, driving, arranging to take buses.

The levels of performance assigned range from dependence to independence, and are rated as follows:

- Dependent = 3
- Requires assistance = 2
- Has difficulty but does by self = 1
- Normal = 0

Two other response options can also be scored:

- Never did [the activity], but could do now = 0
- Never did and would have difficulty now = 1

A total score for the FAQ is computed by simply summing the scores across the 10 items. Scores range from 0 to 30; the higher the score the poorer the function, i.e., the greater the impairment. A cutpoint of "9" (dependent in three or more activities) is recommended.

Source: Pfeffer RI, Kurosaki TT, Harrah CH, et al. Measurement of functional activities of older adults in the community. J Gerontol 1982;37:323–9. Copyright 1982, Gerontological Society of America. Used with permission.

Attachment B. Mini-Mental State Examination

Maximum Score	Score	
		Orientation
5	( )	What is the (year) (season) (day) (month)?
5	( )	Where are we: (state) (county) (town) (hospital) (floor)
		Registration
3	( )	Name 3 unrelated objects, allow 1 second to say each. Then ask the patient to repeat all 3 after you have said them. Give 1 point for each correct answer. Repeat them until he learns all 3. Count trials and record.
		Trials:_____
		Attention and calculation
5	( )	Ask patient to count backwards from 100 by sevens. 1 point for each correct answer. Stop after 5 answers. Alternatively spell "world" backwards.
		Recall
3	( )	Ask patient to recall the 3 objects previously stated. Give 1 point for each correct.
		Language
9	( )	Show patient a wrist watch; ask patient what it is. Repeat for a pencil. (2 points). Ask patient to repeat the following: "No ifs, ands or buts" (1 point). Follow a 3-stage command: "Take a paper in your right hand, fold it in half, and put it on the floor" (3 points). Ask patient to read and obey the following sentence which you have written on a piece of paper. "Close your eyes" (1 point). Ask patient to write a sentence (1 point). Ask patient to copy a design (1 point).

____Total Score

ASSESS level of consciousness along a continuum _____

Alert Drowsy Stupor Coma

Instructions for Administration of Mini-Mental State Examination

Orientation

(1) Ask for the date. Then ask specifically for parts omitted, e.g., "Can you also tell me what season it is?" One point for each correct.

(2) Ask in turn "Can you tell me the name of this hospital?" (town, county, etc.). One point for each correct.

Registration

Ask the patient if you may test his memory. Then say the names of 3 unrelated objects, clearly and slowly, about one second for each. After you have said all 3, ask him to repeat them. This first repetition determines his score (0-3) but keep saying them until he can repeat all 3, up to 6 trials. If he does not eventually learn all 3, recall cannot be meaningfully tested.

Attention and calculation

Ask the patient to begin with 100 and count backwards by 7. Stop after 5 subtractions (93, 86, 79, 72, 65). Score the total number of correct answers. If the patient cannot or will not perform this task, ask him to spell the word "world" backwards. The score is the number of letters in correct order, e.g., dlrow = 5, dlorw = 3.

Recall

Ask the patient if he can recall the 3 words you previously asked him to remember. Score 0-3.

Language

Naming: Show the patient a wrist watch and ask him what it is. Repeat for pencil. Score 0-2.

Repetition: Ask the patient to repeat the sentence after you. Allow only one trial. Score 0 or 1.

3-Stage command: Give the patient a sheet of blank paper and repeat the command. Score 1 point for each part correctly executed.

Reading: On a blank piece of paper print the sentence "Close your eyes," in letters large enough for the patient to see clearly. Ask him to read it and do what it says. Score 1 point only if he actually closes his eyes.

Writing: Give the patient a blank piece of paper and ask him/her to write a sentence. Do not dictate a sentence, it is to be written spontaneously. The sentence must contain a subject and verb and be sensible. Correct grammar and punctuation are not necessary.

Copying: On a clean piece of paper, draw intersecting pentagons, each side about 1 in., and ask him to copy it exactly as it is. All 10 angles must be present and 2 must intersect to score 1 point. Ignore tremor and rotation.

Attachment B (continued)

Estimate the patient's level of sensorium along a continuum, from alert on the left to coma on the right.

Reprinted from the Journal of Psychiatric Research, volume 12, Folstein MF, Folstein SE, McHugh PR. Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. 196-8, 1975. Used with kind permission from Elsevier Science, Ltd., The Boulevard, Langford Lane, Kidlington OX5 1GB UK.

Median Mini-Mental State Examination Score by Age and Educational Level

	Education				
	0–4y	5–8y	9–12y	≥12y	Total
18–24	23	28	29	30	29
25–29	25	27	29	30	29
30–34	26	26	29	30	29
35–39	23	27	29	30	29
40–44	23	27	29	30	29
45–49	23	27	29	30	29
50–54	22	27	29	30	29
55–59	22	27	29	29	29
60–64	22	27	28	29	28
65–69	22	27	28	29	28
70–74	21	26	28	29	27
75–79	21	26	27	28	26
80–84	19	25	26	28	25
≥85	20	24	26	28	25
Total	22	26	29	29	29

Source: Adapted from Crum RM, Anthony JC, Bassett SS, et al. Population-based norms for the mini-mental state examination by age and educational level. JAMA 1993;269:2386–91. Copyright 1993, American Medical Association. Used with permission.

Attachment C. The Blessed Orientation-Memory-Concentration Test

Overview

The six-item Blessed Orientation-Memory-Concentration (BOMC) test was developed by Katzman and colleagues (Katzman, Brown, Fuld, et al., 1983) from the longer (29 item) Blessed Information-Memory-Concentration (BIMC) test (Blessed, Tomlinson, and Roth, 1968). Katzman et al. selected 6 of the original 29 BIMC items based on a series of statistical analyses. The scores from each of the six items are multiplied as detailed below to yield a weighted score. Possible total scores on the BOMC range from 0 (all items answered correctly) to 28 (all items answered incorrectly). Weighted error scores greater than 10 are consistent with dementia, according to Katzman et al. (1983).

Items		Maximum Error	Score		Weight
1	What *year* is it now?	1	_____	x	4 = ___
2	What *month* is it now?	1	_____	x	3 = ___
memory phrase	Repeat this phrase after me: John Brown, 42 Market Street, Chicago				
3	About what *time* is it? (within 1 hour)	1	_____	x	3 = ___
4	*Count* backwards 20 to 1	2	_____	x	2 = ___
5	Say the months in reverse order	2	_____	x	2 = ___
6	Repeat the memory phrase	5	_____	x	2 = ___

Score of 1 for each incorrect response; maximum weighted score = 28.

Source: Katzman R, Brown T, Fuld P, et al. Validation of a short orientation-memory-concentration test of cognitive impairment. Am J Psychiatry 1983;140:734–9. Copyright 1983, American Psychiatric Association. Used with permission.

Attachment D. The Blessed Information-Memory-Concentration Test

"Now I'd like to give you a short memory test that will take about five minutes. Some questions will be easy, some will be more difficult. Are you ready?"

Correct	Error		
0	1	**1.**	Name _____
0	1	**2.**	Age _____
0	1	**3.**	When born _____
0	1	**4.**	Where born _____
0	1	**5.**	Name of this place _____
0	1	**6.**	What street is it on _____
0	1	**7.**	How long have you been here _____ (How long today)
0	1	**8.**	Name of this city _____
0	1	**9.**	Today's date _____
0	1	**10.**	Month _____
0	1	**11.**	Year _____
0	1	**12.**	Day of week _____
0	1	**13.**	Part of day _____
0	1	**14.**	Time (Best guess) _____ (Actual time: _____)
0	1	**15.**	Season _____

Repeat this phrase after me: John Brown, 42 Market Street, Chicago.

0	1	**16.**	Mother's first name _____
0	1	**17.**	Name of one school you attended _____
0	1	**18.**	What kind of work have you done _____
0	1	**19.**	Who is the president now _____
0	1	**20.**	Who was the last president _____
0	1	**21.**	Date of World War I _____
0	1	**22.**	Date of World War II _____
0	1	**23.**	Months of the year backwards. (Start with December) D N O S A Jl Jn M Ap M F Ja
0	1	**24.**	Count from 1 to 20
0	1	**25.**	Count backwards 20 to 1. 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
0 1 2 3 4 5		**26.**	Recall name and address: _____John _____Brown _____42 Market _____Chicago (Cue with "John Brown" only. Score up to 5 errors)

TOTAL SCORE: _____ (The sum of the scores for all 26 questions. Total number of **errors**.)

Instructions for Scoring of the Blessed Information-Memory-Concentration (BIMC) Test

Information Test

Score each item "1" for incorrect response; "0" for correct response.

Item 5:	Possible answers include: home, hospital, etc.
Item 7:	Answer can be given in number of hours, days, etc.
Item 9:	The date must be the actual date of the month, within a day, e.g., the 16th, 5th, etc.
Item 13:	One of the following must be selected: morning, afternoon, evening, night.
Item 14:	Score as correct if within one hour of the actual time.

Memory Test

Score each item "1" for incorrect response, "0" for correct response (except Item 27, see below).

Item 3:	The month and year must both be given correctly.
Item 4:	City and state must be given; town is optional. If foreign born, country is sufficient.
Item 19:	The name of the current president must be given; the last name is sufficient.
Item 20:	The name of the past president must be given; the last name is sufficient.
Item 21:	One of the years WWI took place must be given: 1914 to 1918.
Item 22:	One of the years WWII took place must be given: 1939 to 1945.
Item 26:	If no cue is necessary and the patient recalls both name and address, score "0." If patient cannot spontaneously recall the name and address, cue with "John Brown" one time only. If this cue is necessary, the patient automatically has 2 errors. Score 1 point for each subsequent "unit" the participant cannot recall. The three units are: 42; Market Street; Chicago.

Concentration Test

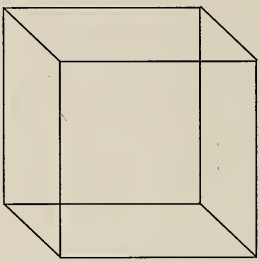
Items 23-25:	For uncorrected errors, score "2"; for self-corrected errors, score "1." For no errors, score "0." Indicate all errors and self corrections.

Source: Katzman R, Brown T, Fuld P, et al. Validation of a short orientation-memory-concentration test of cognitive impairment. Am J Psychiatry 1983;140:734–9. Copyright 1983, American Psychiatric Association. Used with permission.

Attachment E. A Short Test of Mental Status (STMS)

"I would now like to examine your memory and related items. Please relax, pay attention to the questions I am asking, and answer them as best as you can."

1.	Orientation (8)	Name, address, current location (building), city, state, date (day), month, year	_____
2.	Attention (7)	Digit span (present 1/sec; record longest correct span) 2-9-6-8-3, 5-7-1-9-4-6, 2-1-5-9-3-6-2	_____
3.	Immediate recall (4)	Four unrelated words: "apple," "Mr. Johnson," "charity," "tunnel" Number of trials needed to learn all four:	_____ _____
4.	Calculation (4)	5 x 13; 65 – 7; 58 ÷ 2; 29 + 11	_____
5.	Abstraction (3)	Similarities: orange/banana, dog/horse, table/bookcase	_____
6.	Construction (2)	Draw clock face showing 11:15	_____
	Copy (2)		_____



7.	Information (4)	President; first President; define an island; number of weeks per year	_____
8.	Recall (4)	The four words: "apple," "Mr. Johnson," "charity," "tunnel"	_____
	Total Score: (38)	[Raw Score – (number of learning trials – 1)]	_____

Instructions for Administration and Scoring of the Short Test of Mental Status (STMS)

Orientation

Each correct response is worth 1 point. The maximum score is 8.

Attention

Usually a span of five digits is given to the patient. If the patient responds correctly, the span is increased to six and then to seven. The patient's best performance is then recorded. If the patient is able to repeat seven digits forward, the test is terminated. The number of digits correctly repeated is the score; the maximal score is 7, and the minimal score is 0.

Immediate Recall

If the patient learns the words on the first trial, then the next subtest is given. If the patient is unable to learn all four words, the investigator repeats them for a maximum of 4 trials and records the number of trials that the patient requires to learn all 4 words. If the patient is unable to learn all four words by the end of the fourth trial, the patient's best performance is recorded (the number of words learned and the number of trials required). Learning is scored in two part. A point is earned for each word learned (a maximum of 4 points). One less than the number of trials (a maximum of 4) required to learn the words was subtracted from the score. Thus, the values that were subtracted were between 0 and 3.

Calculation

Each correct answer earns 1 point, and the maximal score is 4.

Abstraction

One point for each word pair is given only for definitely abstract interpretations (for example, horse/dog = animal). Concrete interpretations or inability to see a similarity earns 0 points for that word pair. The maximal score is 3.

Construction and Copying

The patient is able to view the diagram of a cube while drawing his or her own version. For each construction, an adequate conceptual drawing is scored as 2, a less than complete drawing earns a score of 1, and inability to perform the task earns a score of 0. The maximum score for the construction tasks is 4.

Information

Each correct answer earns 1 point, and the maximal score is 4.

Attachment E (continued)

Recall

At the end of the test, the patient is asked to recall the four words from the immediate recall subtest. No cues or reminders are provided. The patient earns 1 point for each word recalled, and the maximal score is 4.

Total Score

Total score = sum of subtest scores – (number of trials for acquisition – 1). For example, if a patient learned all four words on the first trial, nothing was subtracted from the sum of the subtest scores. If a patient required four trials to learn some or all four words, then 3 was subtracted from the sum of the subtest scores.

Source: Kokmen E, Naessens JM, Offord KP. A short test of mental status: description and preliminary results. Mayo Clinic Proc 1987;62:281–8. Copyright 1987, Mayo Clinic Foundation. Used with permission.

Notes

Notes

Availability of Guidelines

For each clinical practice guideline developed under the sponsorship of the Agency for Health Care Policy and Research (AHCPR), several versions are produced to meet different needs.

The *Clinical Practice Guideline* presents recommendations for health care providers with brief supporting information, tables and figures, and pertinent references.

The *Quick Reference Guide* is a distilled version of the *Clinical Practice Guideline,* with summary points for ready reference on a day-to-day basis.

The *Consumer Guide,* available in English and Spanish, is an information booklet for the general public to increase consumer knowledge and involvement in health care decisionmaking.

To order single copies of the *Quick Reference Guide* or *Consumer Guide,* or to obtain further information on their availability, call the AHCPR Publications Clearinghouse toll-free at 800-358-9295 or write to: AHCPR Publications Clearinghouse, P.O. Box 8547, Silver Spring, MD 20907.

Single copies of the *Clinical Practice Guideline* are available for sale from the Government Printing Office, Superintendent of Documents, Washington, DC 20402, with a 25-percent discount given for bulk orders of 100 copies or more. The *Quick Reference Guide* and the *Consumer Guide* in English also are available for sale in bulk quantities only. Call (202) 512-1800 for price and ordering information.

The *Guideline Technical Report* contains supporting materials for the *Clinical Practice Guideline*, including background information, methodology, literature review, scientific evidence tables, recommendations for research, and a comprehensive bibliography. The *Technical Report* may be ordered from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. Call (703) 487-4650 for price and ordering information.

The full text of guideline documents for online retrieval is available on Internet through the AHCPR Home Page. Access the guideline products by using a Web browser, specifying URL http://www.ahcpr.gov/guide/ and clicking on "Clinical Practice Guidelines Online."

A fact sheet describing Online Access for Clinical Practice Guidelines (AHCPR Publication No. 94-0075) and copies of the *Quick Reference Guide* and the *Consumer Guide* of each guideline are available through AHCPR's InstantFAX, a fax-on-demand service that operates 24 hours a day, 7 days a week. AHCPR's InstantFAX is accessible to anyone using a facsimile machine equipped with a touchtone telephone handset: Dial (301) 594-2800, push "1," and then press the facsimile machine's start button for instructions and a list of currently available publications.

U.S. Department of Health and Human Services
Agency for Health Care Policy and Research
2101 East Jefferson Street, Suite 501
Rockville, MD 20852

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